

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of the Claims:

1. (Original) A sonochemical reactor comprising a reaction chamber having a plurality of externally mounted transducers physically coupled thereto, the transducers being spaced apart along a longitudinal axis of the chamber and in which the transducers are operable to excite the reaction chamber walls in a breathing mode.
2. (Original) A sonochemical reactor according to Claim 1 in which cavitation is induced within the reaction chamber predominantly in a central region remote from the reaction chamber wall.
3. (Original) A reactor as claimed in Claim 1, in which each said transducer is a ring transducer.
4. (Original) A reactor as claimed in Claim 2, in which the transducer is radially poled.
5. (Original) A reactor as claimed in Claim 2 in which the transducer is tangentially poled.
6. (Previously presented) A reactor as claimed in Claim 1, in which the transducers are spaced apart by a distance of substantially one quarter or less of the wavelength of their excitation frequency.
7. (Previously presented) A reactor as claimed in Claim 1, in which each transducer lies substantially within a respective plane orthogonal to said longitudinal axis.

8. (Previously presented) A reactor as claimed in Claim 1, in which the reaction chamber is a thin-walled right circular cylinder.
9. (Previously presented) A reactor as claimed in Claim 1, in which the reaction chamber is oil-cooled.
10. (Previously presented) A reactor according to Claim 1 in which the transducers are driven in phase with each other.
11. (Previously presented) A reactor according to Claim 1 further comprising a sleeve disposed around the reaction chamber, the transducers being mounted on an outer face of the sleeve and the volume between the sleeve and the reaction chamber containing a first fluid of a viscosity higher than a second fluid around the transducers.
12. (Original) A reactor according to claim 11 in which the first fluid is oil.
13. (Previously presented) A reactor according to Claim 11 in which the second fluid is air.
14. (Previously presented) A reactor according to Claim 11 in which one or more of the first and second fluids is circulated to provide a cooling effect.
15. (Previously presented) A reactor as claimed in Claim 1, in which a separate inlet and outlet is provided to the reaction chamber.
16. (Previously presented) A controller for a reactor as claimed in Claim 1, the controller being arranged to operate the transducers in a breathing mode.

17. (Previously presented) A sonochemical processing system including at least one reactor as claimed in Claim 1, the system further including a holding tank connected to an inlet of said reactor and a collection tank connected to said outlet.
18. (Original) A system as claimed in Claim 17, further including a manifold connecting said holding tank to a plurality of reactors.
19. (Currently amended) A method of insonifying a fluid, the method comprising the steps of:
 - providing a sonochemical reactor as claimed in claim 1 ~~reaction chamber having a plurality of externally mounted transducers physically coupled thereto, the transducers being spaced apart along a longitudinal axis of the chamber;~~
 - locating the fluid in the reaction chamber; and
 - operating the transducers so as to excite the reaction chamber walls in a breathing mode.
20. (Original) A method according to claim 19 in which the fluid is one of waste sludge, industrial effluent, a chemical or pharmaceutical compound, a hydrocarbon, and a food product or component.
21. (Currently amended) A computer readable medium including a program for a computer that is adapted to operate the ~~for operating~~ sonochemical reactor of claim 1 comprising a ~~reaction chamber having a plurality of externally mounted transducers physically coupled thereto, the transducers being spaced apart along a longitudinal axis of the chamber,~~ the program having code portions arranged to operate the transducers so as to excite the reaction chamber walls in a breathing mode.